REMARKS

In the Office Action of October 9, 2002, Claims 1 - 3, 5, 6 and 8 - 10 were rejected. No claim was allowed. In response, Claims 1, 3, 5 and 8 are amended and new Claims 11 - 19 are added to the application. (Please note that Claim 6 was canceled in Applicants' response of September 3, 2002.) Reexamination and reconsideration are respectfully requested in view of the foregoing amendments and the following remarks.

Amendments and New Claims

As discussed below, Claims 1 and 8 are amended to delete C6H4SO3H from the definition of hydrophobic (Hb) units. Claim 3 is amended to delete polymers S1 and S2 from the selection of hydrophilic/hydrophobic polymers, since they do not contain hydrophobic units. However, since S1 or S2 may be included in embodiments of the slurry of the invention, Claim 5 is amended to provide that the slurry contains at least one of S1 or S2, but as an additional polymer added to a slurry that contains HMPAM, a hydrophilic/hydrophobic polymer. The definition of S1 and S2 is revised so that polymers are not improperly designated as hydrophilic/hydrophobic polymers. It is respectfully submitted that no new matter is introduced by these revisions.

New Claims 11 - 20 are method claims directed to cementing a well bore drilled through at least one geological formation having a certain permeability using the cement slurry of the present invention.

Objections to the Sp cification

The disclosure was objected to because of informalities. In particular, the Examiner alleges that C6H4SO3H (styrene sulfonate) is not hydrophobic, but is hydrophilic, and that accordingly, S1 and S2 are hydrophilic copolymers, not hydrophilic/hydrophobic copolymers. In response, C6H4SO3H is deleted from the definition of hydrophobic (Hb) units.

The disclosure was further objected to on the grounds that the particle size ranges of silica and microsilica overlap. This objection is traversed. It is respectfully submitted that silica and microsilica are recognized by persons skilled in the art as being distinct ingredients, despite any incidental overlap in size ranges. For example, persons skilled in the art would understand that silica and microsilica each have a Gaussian distribution of particle sizes within their respective size ranges, with silica having a grain size distribution centered at about 100 μm (roughly the middle of the 5 - 200 μm size range) and microsilica having a grain size distribution centered at about 10 μm (roughly the middle of the .1 to 20 μm size range).

Accordingly, it is respectfully submitted that the objections to the specification are thereby overcome.

Rejection of Claims 1 - 3, 5, 6 and 8 - 10 under 35 U.S.C. 112, first paragraph: written description

Claims 1 - 3, 5, 6 and 8 - 10 were rejected under 35 U.S.C. 112, first paragraph, as allegedly containing subject matter that is not described in the specification in such a way as to enable one skilled in the art to make and use

the invention. In particular, the Examiner alleges that that C6H4SO3H (styrene sulfonate) is not hydrophobic, but is hydrophilic, and that accordingly, S1 and S2 are hydrophilic copolymers, not hydrophilic/hydrophobic copolymers.

In response, C6H4SO3H is deleted from the definition of hydrophobic (Hb) units in Claims 1 and 8, and Claim 3 is amended to delete S1 and S2 as hydrophilic/hydrophobic polymers. Claim 5 is amended to provide that the slurry contains at least one of S1 or S2, but as an additional polymer added to a slurry that contains HMPAM, a hydrophilic/hydrophobic polymer. S1 and S2 are defined without reference to hydrophilic or hydrophobic units. Accordingly, it is respectfully submitted that this rejection is thereby overcome.

Rejection of Claims 1 - 3, 5, 6 and 8 - 10 under 35 U.S.C. 112, first paragraph: enablement

Claims 1 - 3, 5, 6 and 8 - 10 were rejected under 35 U.S.C. 112, first paragraph, on the alleged grounds that the specification does not provide enablement for the claimed copolymers. In particular, the Examiner alleges that acrylamide/styrene sulfonate copolymers and acrylic acid styrene sulfonate copolymers are hydrophilic, not hydrophilic/hydrophobic. In response, as discussed above, C6H4SO3H is deleted from the definition of hydrophobic (Hb) units in the specification and in Claims 1 and 8, so that the definition of (Hb) units does not encompass units that can be considered hydrophilic. Claim 3 is amended to delete S1 and S2 as hydrophilic/hydrophobic polymers. Claim 5 is amended to provide that the slurry contains at least one of S1 or S2, but as an additional polymer added to a slurry that contains HMPAM, a

hydrophilic/hydrophobic polymer. S1 and S2 are defined without reference to hydrophilic or hydrophobic units. Accordingly, it is respectfully submitted that this rejection is thereby overcome.

Rejection of Claims 1 - 3, 5, 6 and 8 - 10 under 35 U.S.C. 112, first paragraph: written description

Claims 1 - 3, 5, 6 and 8 - 10 were rejected under 35 U.S.C. 112, first paragraph, as allegedly containing subject matter that was not described in the specification. The Examiner notes that the claims use the term "molecular mass", which, in the case of polymers, must be an average molecular mass. The Examiner alleges that persons skilled in the art would not know which average molecular mass is meant, whether it be weight average, number average, viscosity average, peak average or Z average.

This rejection is respectfully traversed. Applicants respectfully submit a Declaration under 37 CFR 1.132 of Guy Muller, wherein he declares that the typical practice in the art of well fluid additives is to measure the average molecular weight of polymer additives as a weight average and that therefore, persons skilled in the art of well fluid additives, upon reading the specification, would understand, based on the contents of the specification and the typical practice in the art, that the average molecular weight mentioned in the application was the weight average. Accordingly, it is respectfully submitted that this rejection is thereby overcome.

R j ction of Claims 1 - 3, 5, 6 and 8 - 10 und r 35 U.S.C. 112, second paragraph: indefiniteness

Claims 1 - 3, 5, 6 and 8 - 10 were rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite.

The Examiner notes that the particle sizes of silica and microsilica overlap and questions where silica having a particle size of 5 - 20 microns belongs.

This rejection is traversed. As discussed above, silica and microsilica are recognized by persons skilled in the art as being distinct ingredients, despite any incidental overlap in size ranges. For example, persons skilled in the art would understand that silica and microsilica each have a Gaussian distribution of particle sizes within their respective size ranges, with silica having a grain size distribution centered at about 100 μm (roughly the middle of the 5 - 200 μm size range) and microsilica having a grain size distribution centered at about 10 μm (roughly the middle of the .1 to 20 μm size range). Accordingly, it is respectfully submitted that Claims 1 - 3, 5, 6, and 8 - 10 are not indefinite for reciting both silica and microsilica.

The Examiner alleges that the use of the term "molecular mass" without specifying the proper average molecular mass is indefinite.

This rejection is respectfully traversed. As discussed above, the Declaration under 37 CFR 1.132 of Guy Muller states that the typical practice in the art of well fluid additives is to measure the average molecular weight of polymer additives as a weight average and that therefore, persons skilled in the art of well fluid additives, upon reading the specification, would understand, based on the contents of the specification and the typical practice in the art, that

the average molecular weight mentioned in the application was the weight average. Accordingly, it is respectfully submitted that this rejection is thereby overcome.

Rejection of Claims 1 - 3, 5, 6, and 8 - 10 under 35 U.S.C. §102(b) or §103(a) over Lynn, Koga et al, Yamaguchi et al, or Yamato in view of Audibert or Argillier

Claims 1 - 3, 5, 6 and 8 - 10 were rejected under 35 U.S.C. §102(b) as anticipated by, or in the alternative, under 35 U.S.C. §103(a) as obvious over Lynn (U.S. Patent No. 4,525,500), Koga et al (U.S. Patent No. 4,662,942), Yamaguchi et al(U.S. Patent No. 4,888, 059), or Yamato et al (U.S. Patent No. 5,707,445) in view of Audibert or Argillier.

This rejection is respectfully traversed. The present invention belongs to the field of invention of cement slurries to be set in a wellbore in a porous geological formation. On one hand, a cement slurry for a wellbore is different from well fluid, which is formulated to circulate up and down a well during the course of drilling activities. On the other hand, a cement slurry for a wellbore is different from materials such as mortar or other mixtures for building or molding, since the cement slurry must have a sufficient rheology to be pumped into a well. Therefore, to the extent that the compositions described in the cited references differ from the composition of the present invention, in terms of, for example, the identity of the units or the molecular weight of the copolymer, there is no motivation to alter the disclosed composition because of the differences in

intended uses.

Specifically, Lynn does not disclose or suggest a copolymer having a molecular mass ranging between 500000 and 10^7 daltons and does not disclose or suggest silica particles with grain size ranges between 5 and 200 μm. Further, since Lynn relates to a composition for cement mortars for building material and not to a cement slurry for a wellbore, there is no motivation to alter the ingredients of the Lynn composition.

Koga discloses a composition including a sulfonated styrene-maleic acid copolymer of low molecular weight (1,000 to 9,000). The copolymer thus has a different composition from the hydrophilic/hydrophobic polymer of the present invention as set forth in the amended claims, since the present claims do not include styrene sulfonate or maleic acid. Further, the reference does not disclose or suggest a copolymer having a molecular mass ranging between 500000 and 10^7 daltons and does not disclose or suggest a cement slurry for a wellbore.

Yamaguchi discloses a cement dispersing agent comprising units from (a) an ethylenically unsaturated monocarboxylic acid or salt thereof and (b) an acrylic or methacrylic ester of monohydric alkyl alcohol having 1 - 4 carbon atoms. Further, the dispersing agent has a molecular weight of 1000 to 50000. The dispersing agent has a different composition from the polymer of the present invention, since, in the present invention, the definition of R'1 in COOR'1 is limited to C9 - C30 moieties. The reference does not disclose or suggest a copolymer having units of an ester of an alcohol having 9 to 30 carbons. Moreover, Yamaguchi does not disclose or suggest a polymer having a

molecular mass ranging between 500000 and 10^7 daltons. The reference expressly teaches against a copolymer with a molecular weight over 50000 (col. 4,line 53). Further, the reference does not disclose or suggest a cement slurry for a wellbore.

Yamato discloses the use of copolymers resulting from (a) a polyalkylene glycol monoester of unsaturated monocarboxylic acid having 110 to 300 mols of exyalkylene groups of 2 or 3 carbon atoms and (b) at least one monomer that appears to be an acrylic acid or salt, a dicarboxylic acid or salt, or an acrylomethylsulfonate. In such copolymers, both (a) and (b) moieties are hydrophilic. The reference does not disclose or suggest a polymer having the hydrophilic and hydrophobic units as specifically defined in the present invention. Further, the reference does not disclose or suggest a cement slurry for a wellbore.

The secondary references, Argillier and Audibert disclose their copolymers as being useful for filtrate reduction in well fluids, such as drilling fluids, completion fluids or workover fluids, but they do not teach or suggest that the copolymers are useful for cement slurries for cementing well bores. The technical field of well fluids is different from that of cement slurries for cementing well bores such that a person skilled in the art would not apply teachings from the field of well fluids to the field of cement slurries for cementing well bores. On one hand, a well fluid is a suspension of inert particles and cuttings, and the fluid is formulated for circulating up and down through a well bore. On the other hand, a cement slurry for cementing a well bore is a suspension of particles that interact to form a cement that holds the steel casing in place in the well bore.

The Argillier and Audibert references do not contain any teaching or suggestion that the compounds disclosed therein would have any usefulness for filtrate reduction in the context of a cement slurry in a wellbore. Accordingly, there would have been no motivation for a person skilled in the art to combine the copolymers of Argillier and Audibert with the cement slurry of any of the preceding references.

In view of the above, it is respectfully submitted that Claims 1 - 3, 5 and 8 - 10, and new Claims 11 - 19 would not have been obvious over Lynn, Koga, Yamaguchi, Yamato, Audibert or Argillier, alone or in any combination.

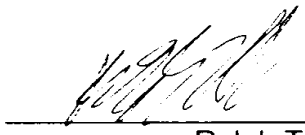
Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that Claims 1 - 3, 5 and 8 - 10 and new Claims 11 - 19 are in condition for allowance. Favorable reconsideration is respectfully requested.

Should the Examiner believe that anything further is necessary to place this application in condition for allowance, the Examiner is requested to contact applicants' undersigned attorney at the telephone number listed below.

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 01-2135 (612.39487X00).

Respectfully submitted,
ANTONELLI, TERRY, STOUT & KRAUS



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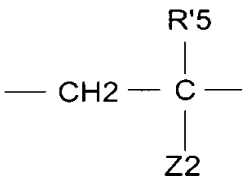
IN THE SPECIFICATION

Please replace the text beginning on page 3, line 3 with the following:

- Hb has the following form:



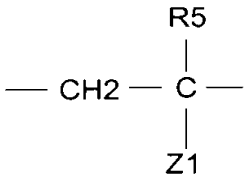
where R'5 is H or CH3 and Z2 is COOR7, ~~C6H4SO3H,~~ COOR'1, CONR1R'1 or CONR1R7, R7 being a non-ionic surfactant consisting of an alkyl polyoxyethylene chain, R1 is H or a C1-C30 alkyl, aryl or alkyl-aryl radical, and R'1 is a C9-C30 alkyl, aryl or alkyl-aryl radical.

IN THE CLAIMS

1) (twice amended) A cement slurry intended to be set in a wellbore through at least one geologic formation having a certain permeability, characterized in that it comprises cement, at least one mineral filler consisting of silica with grain size ranges between 5 and 200 μm, water and a determined amount of at least one polymer with hydrophilic (Hy) and hydrophobic (Hb) units in aqueous

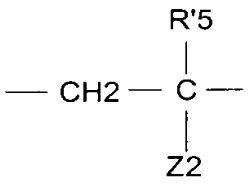
solution, said polymer having the following structure: —(Hb)—-(Hy)—— with a statistical distribution, and:

- Hy has the following form:



where R5 is H or CH3, and Z1 is COOH or CONH2 or CONHR1SO3, or CONHR"1, R"1 is CH3;

- Hb has the following form:



where R'5 is H or CH3 and Z2 is COOR7, ~~C6H4SO3H,~~ COOR'1, CONR1R'1 or CONR1R7, R7 being a non-ionic surfactant consisting of an alkyl polyoxyethylene chain, R1 is H or a C1-C30 alkyl, aryl or alkyl-aryl radical, and R'1 is a C9-C30 alkyl, aryl or alkyl-aryl radical,

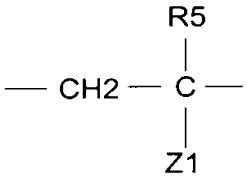
wherein said polymer has a molecular mass ranging between 500000 and 10^7 daltons.

3) (three times amended) A slurry as claimed in Claim 1, ~~comprising at least one of the polymers selected from the group consisting of:~~

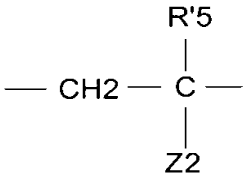
- wherein the polymer with hydrophilic (Hy) and hydrophobic (Hb) units is HMPAM, where R5 is H and Z1 is CONH2, R'5=CH3 and Z2 is COOR'1 with R'1=C9H19,

~~- S1, S2 where R5 is H and Z1 is CONH2, R'5=H and Z2 is C6H4SO3H~~.

5) (amended) A slurry as claimed in claim 3, wherein ~~said polymer S1 or S2 is combined with polymer HMPAM~~ the slurry further contains a polymer selected from the group consisting of an unbranched polymer S1 and a branched polymer S2, wherein S1 and S2 are each made up of units of



and

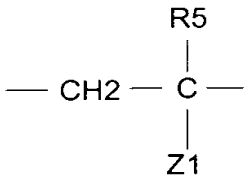


with a statistical distribution, wherein R5 is H and Z1 is CONH2, R'5=H and Z2 is C6H4SO3H.

8) (amended) A cement slurry intended to be set in a wellbore through at least one geologic formation having a certain permeability, characterized in that it comprises cement, at least one mineral filler, water and a determined amount of at least one polymer with hydrophilic (Hy) and hydrophobic (Hb) units in

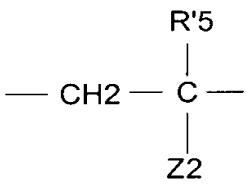
aqueous solution, said polymer having the following structure: —(Hb)—(Hy)—— with a statistical distribution, and:

- Hy has the following form:



where R5 is H or CH3, and Z1 is COOH or CONH2 or CONHR1SO3, or CONHR"1, R"1 is CH3;

- Hb has the following form:



where R'5 is H or CH3 and Z2 is COOR7, ~~C6H4SO3H,~~ COOR'1, CONR1R'1 or CONR1R7, R7 being a non-ionic surfactant consisting of an alkyl polyoxyethylene chain, R1 is H or a C1-C30 alkyl, aryl or alkyl-aryl radical, and R' 1 is a C1-C30 alkyl, aryl or alkyl-aryl radical,

wherein the mineral filler consists of silica whose grain size ranges between 5 and 200 μm and microsilica whose grain size ranges between 0.1 and 20 μm and a small water content of 30 cc for 144 g of solids (cement, silica and microsilica).